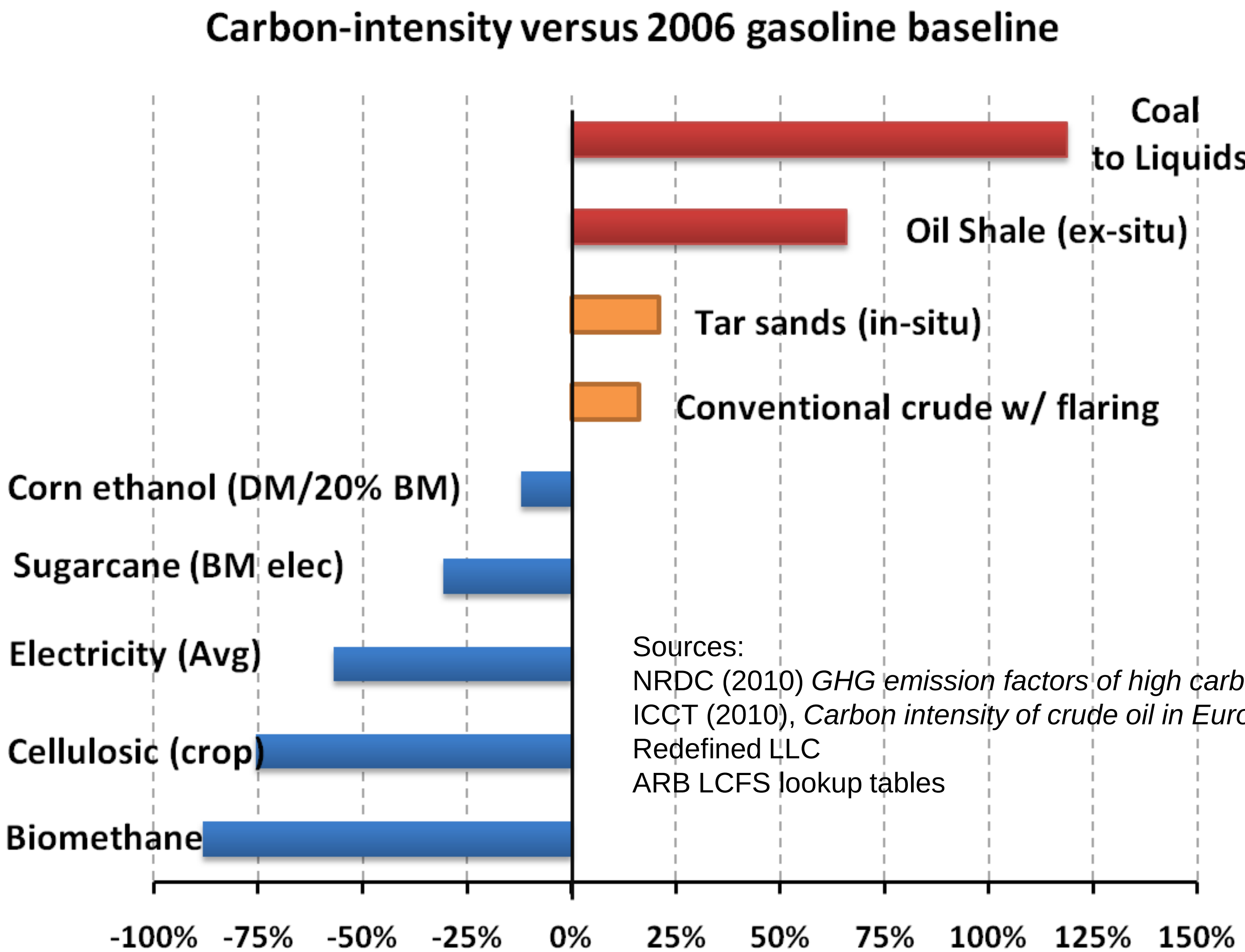
Accounting for High Carbon Intensity Crude Oils in Low Carbon Fuels Policies

California Air Resources Board
LCFS Advisory Panel Meeting
July 1, 2011
Sacramento, CA

Simon C. Mui, Ph.D.
Scientist, Clean Vehicles and Fuels
Natural Resources Defense Council

Ignoring HCICO sources is not an option



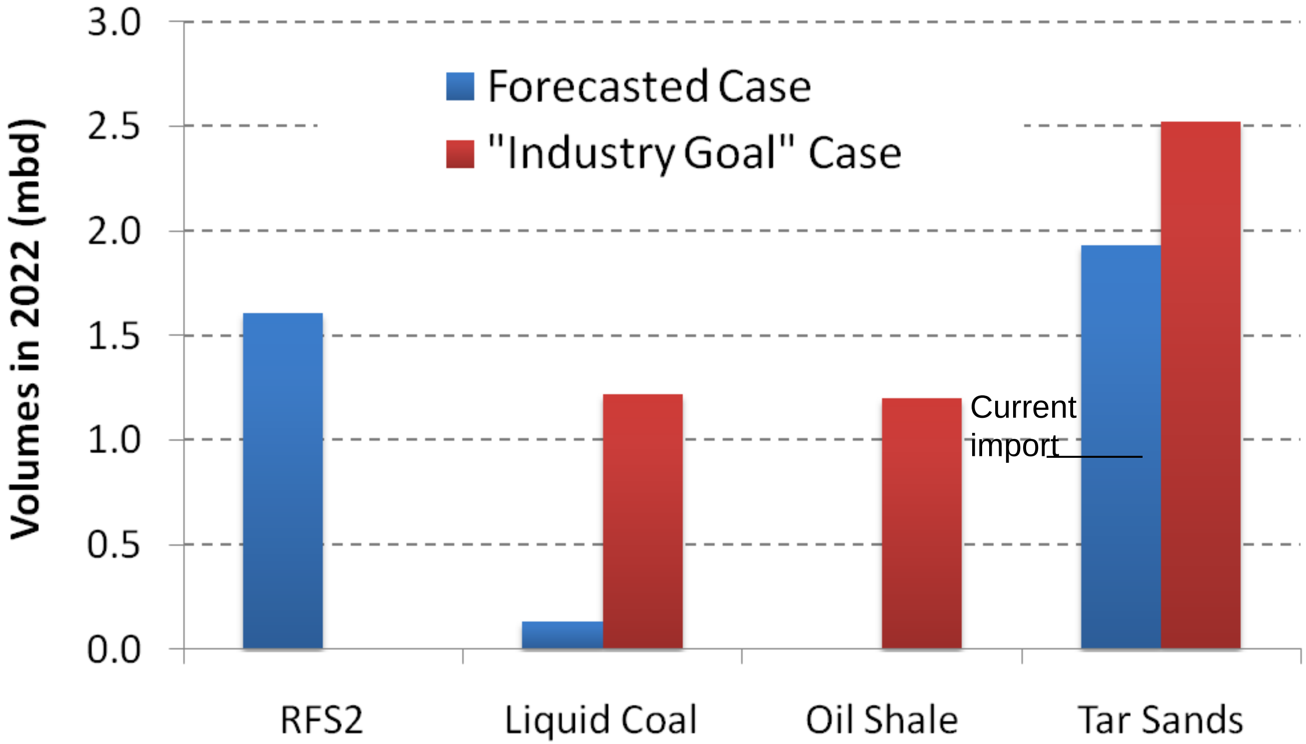
Sources:
NRDC (2010) *GHG emission factors of high carbon-intensity crude oils*;
ICCT (2010), *Carbon intensity of crude oil in Europe Crude,.* Energy-Redefined LLC
ARB LCFS lookup tables

High carbon-intensity fuels could fully offset the Renewable Fuel Standard's carbon benefits

RFS2 requirement - 1.6 mbd-equivalent oil by 2022.

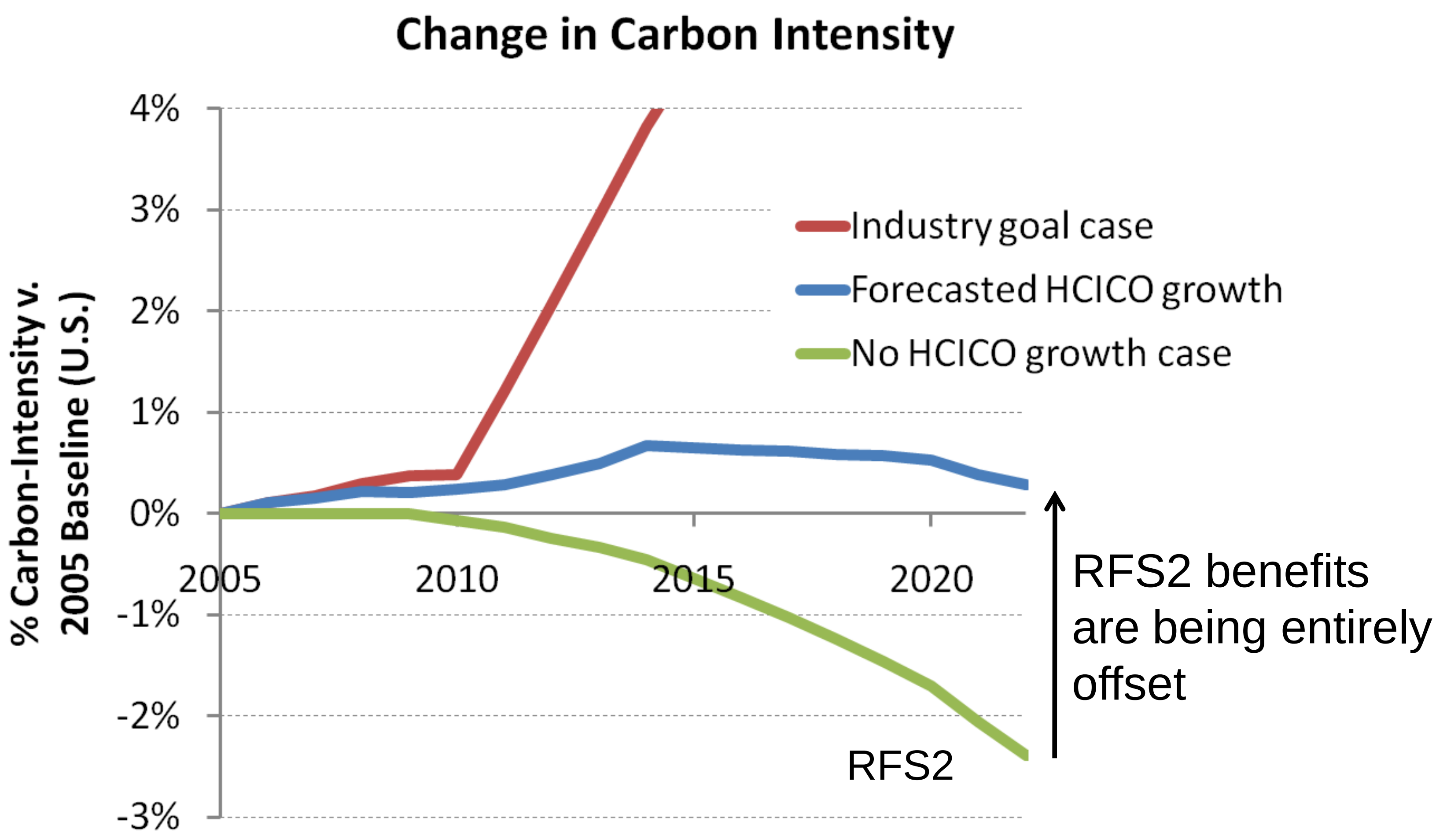
Tar Sands, Oil Shale, Liquid Coal (3 potential HCICOs)

- Forecasted case - 2 mbd by 2022
- Industry goal case - 5 mbd by 2022



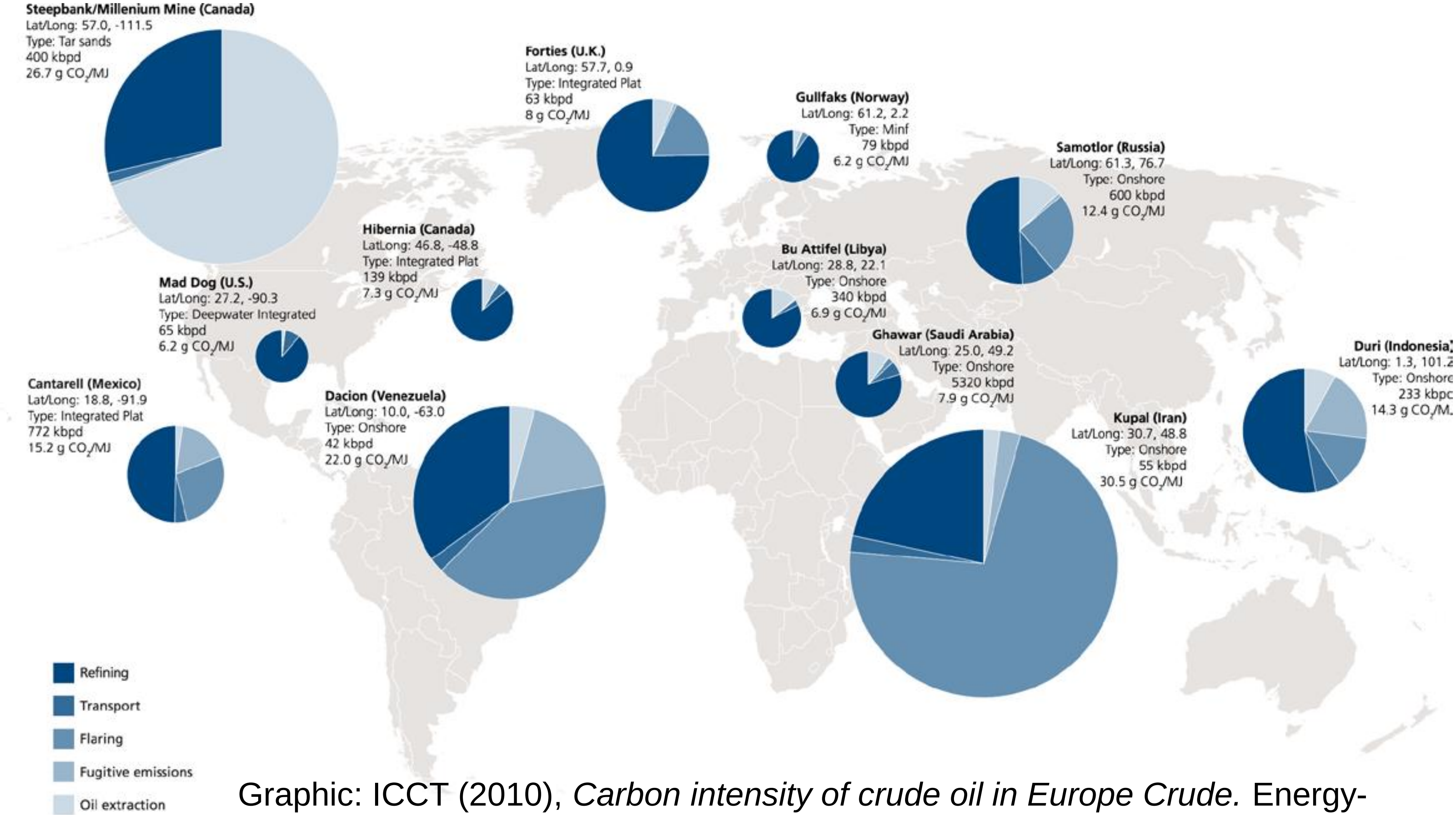
Data sources: Forecasted case: U.S. Annual Energy Outlook 2009 reference case, Canadian Pembina Institute (tar sands); Industry goal case: RAND studies, Canadian Association of Petroleum Producers, moderate growth case *(tar sands)*

High carbon intensity fuels could fully offset the Renewable Fuel Standard's carbon benefits



Data sources: Forecasted case: U.S. Annual Energy Outlook 2009 reference case, Canadian Pembina Institute (tar sands); Industry goal case: RAND studies, Canadian Association of Petroleum Producers, moderate growth case (tar sands)

Wellhead to refinery emissions for selected oil fields



Graphic: ICCT (2010), *Carbon intensity of crude oil in Europe Crude.* Energy-Redefined LLC

Desired elements of a high-carbon intensity crude oil provision

Four goals for a well-designed HCICO provision

1. **Do no further harm**. Require refineries to account for additional emissions beyond their baseline.

2. **Increases innovation** by giving the right signal to upstream oil producers and refineries to invest in innovative projects to reduce emissions from crude oil sources

Desired signals
1) Market: Increase market value of low CI crude oils relative to high CI values, reducing growth of the latter
2) Reduction activities: Increase value of projects that reduce CI emissions from upstream producers
3) Low CI alt fuels: Increase relative value of lower CI alternative fuels

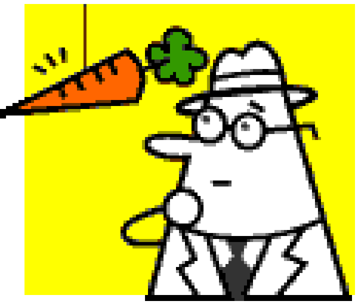
Four goals for a well-designed HCICO provision

3. **Results in emissions being "Daylighted" and reported** in terms of different production techniques, operating practices, and sources.

4. **Maximizes positive "leakage" and minimizes negative carbon leakage**

Positive carbon leakage	Negative carbon leakage
Leadership example to other jurisdictions enacting clean fuels policies	Shuffling HCICOs elsewhere (although doesn't necessarily increase emissions)
Increase rate of technology innovation	
New information can lead to proactive industry investments	

Many opportunities for petroleum producers to innovate and reduce emissions, but little motivation and investment



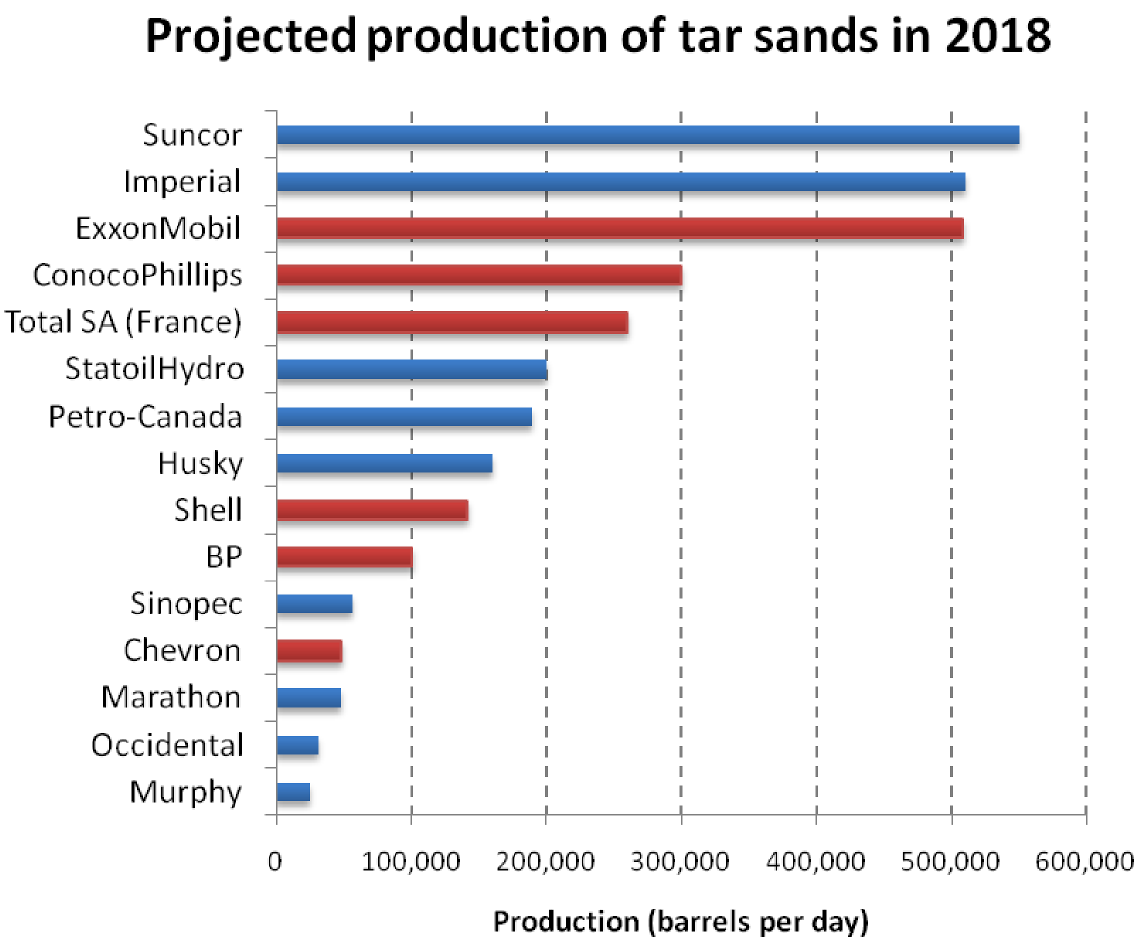
1. **Challenge:** Need motivation to account, invest, and reduce emissions → HCICO provision

2. **Flexibility:** The HCICO provision could serve as an additional flexibility mechanism for refineries to generate credits for crudes from sources with reduction projects. This added flexibility could reduce overall LCFS compliance costs for some.

3. **Design:** Any crediting would need to be well-designed so that reductions are real, additional, and verifiable.

4. **Low-Hanging Fruit:** Stakeholders should identify and inventory the reduction opportunities and potential

Investments in HCICOs by oil companies dwarf biofuel investments



Industry

•$140 invested in tar sands since 1997

•$9.6 billion annually (average)

Statistics: Exxon-Mobil (2008)*

• Exxon-Mobil, $37 billion cash on balance sheets

•$25 billion in capital and exploration expenditures

• $0.1 billion in algae biofuels annually (beginning July 2009)

• Most profits in upstream business ($20/barrel 1Q11)

Sources: http://www.ceres.org/resources/reports/oil-sands-2010

•http://www.ft.com/cms/s/0/7906062e-a68f-11dd-95be-000077b07658.html?nclick_check=1

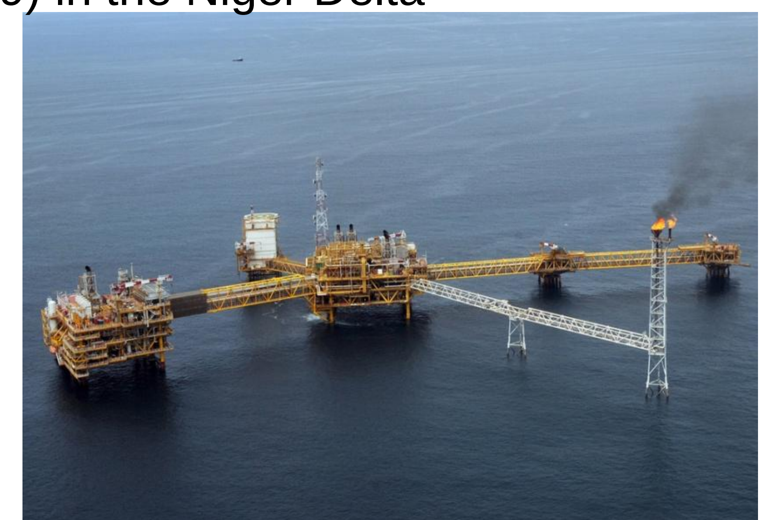
•http://www.exxonmobil.com/Corporate/Files/news_presentation_1q11.pdf

Reducing flaring: Low-hanging fruit

NOAA National Geophysical Data Center

Royal Dutch Shell, Nigeria (2005)

Total Oil platform flaring (2009) in the Niger Delta

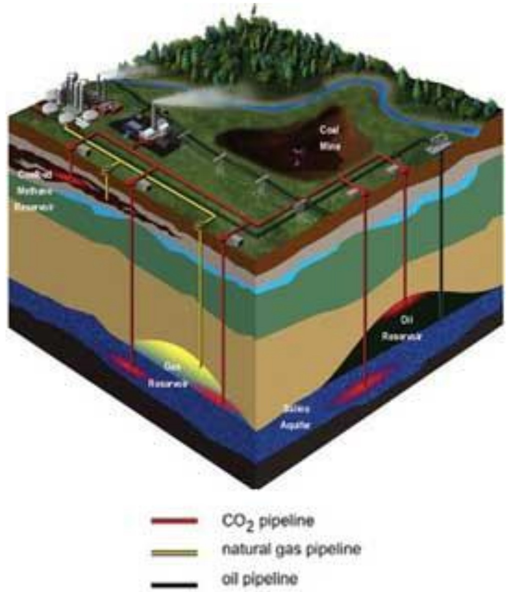


“Nigeria: The Cost of Oil,” Ann Taylor, *The Atlantic: In Focus,* June 8, 2011

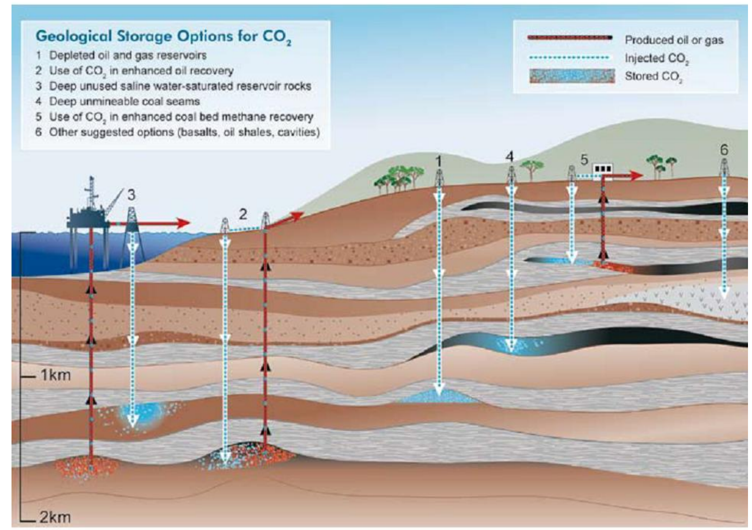
Many technology and operation-based GHG emission reduction opportunities

NRDC
THE EARTH'S BEST DEFENSE

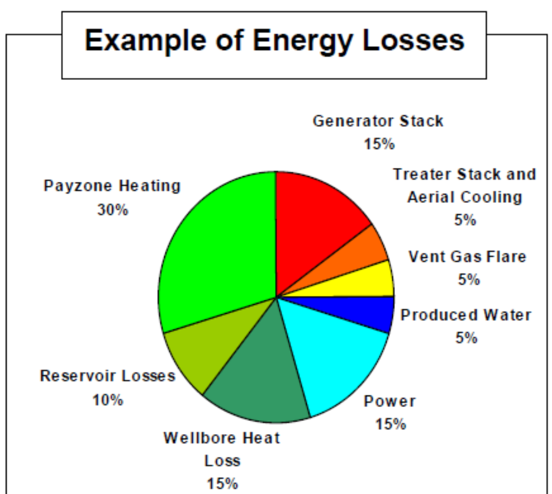
Carbon Capture of Facility Emissions



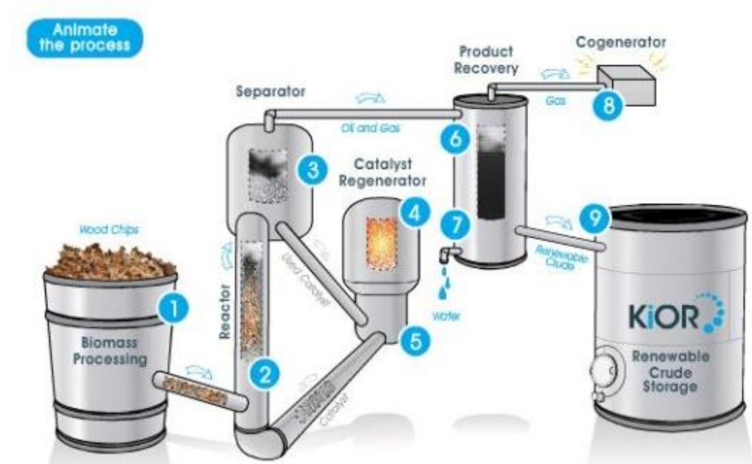
Enhanced Oil Recovery (CCS)



Energy Efficiency



Fuel Input Switching



Review of Potential Changes to the HCICO Provision in Response to WSPA/Industry Concerns

Preliminary qualitative comparison of options

Option	Accurate CA accounting	Discourages growth in CA baseline/HCI COs	Encourages Innovative Activities	Minimizes crude shuffling	Total
1. Current regulation	****	****	**	***	13
2. CA moving average	*****	**	****	*****	15
3. Hybrid CA/Company Specific	*****	*****	*****	****	18
4. Company specific	Same as above	Same as above	Same as above	Same as above	18
5. World moving average	None	None	None	***** (?)	0 to 5

Option 5: World crude averaging is not a HCICO provision. It's a data gathering provision.

- Recognizes that carbon intensity of gasoline/diesel can change **BUT…**
- It does nothing to reduce the use of HCICOs either globally or in California
- It won't reflect actual % increases in California's baseline
- It provides no reason for innovation
- Implementation wise, ARB would need to calculate carbon scores and volumes for all the world's crude oils without having impact

→ NRDC strongly opposes Option 5 as inconsistent with the intent of the adopted LCFS and direction from the Board to address HCICOs.

ARB should work to also close a potential loophole for imported finished products

- **Although currently the amount of imported finished products is a small fraction, accounting also needs to occur for any increase in CI from these imports.**
- **Will prevent leakage and is a fairer approach for all producers.**

→ As a second step, ARB should develop an equivalent mechanism to account for imported finished products that are also increasing their emissions over time

Addressing Oil Industry Concerns Regarding the Current HCICO Requirements

All options hold refineries harmless if they don’t increase their 2006 average

Earlier industry comments: The current provision will be too costly

→ **<u>Provision only impacts refineries that are increasing their baseline carbon-intensity value</u>**.

→ **<u>Fair and flexible</u>.** A refinery that increases the CI of the baseline should account for those emissions. There are four ways to comply.

→ **<u>Could even reduce costs through flexibility mechanisms to generate credits</u>.** CARB gives an example of a CCS project. *We note that this should real, verifiable projects and be a limited flexibility measure so low-carbon fuel volumes are not undermined.*

Proposed options treat crude oils the same, so long as the average baseline doesn't increase

Industry comments: All crude oils should be treated the same

→ ***GHG Emissions.*** The emissions from crude oils can be vastly different.

→ ***Industry already distinguishes crude oils*** *based on their properties and by marketing name.*

→ ***Performance-based.*** The new options would regulate the average CI crude oil baselines, not HCICO crude oil purchases persay.

→ ***Leakage.*** Not accounting for HCICOs means carbon leakage is occurring within the LCFS.

→ ***Fairness.*** Each alternative fuel gets scored with a carbon intensity (CI) value.

The HCICO provision can be designed to minimize leakage

Industry comments: Crude shuffling (i.e. carbon leakage) will occur

→ ***Leakage can be managed*** to reduce undesired behavior while increasing the desired behavior. Focusing on refinery average CIs, as opposed to specific HCICOs, would reduce shuffling.

→ ***Theory versus practice.***

- *Infrastructure constraints (distribution and refinery)*
- *Past claims haven't born out (e.g. CA clean car standards)*

→ ***Additional ways to comply.*** *Scenarios don't account for (1) the option to reduce emissions upstream, (2) compliance through acquiring credits or low-carbon fuels, or (3) value of added flexibility to the HCICO provision to generate credits*

→ **Positive leakage.** *CA leadership for other regions, innovation spurred will mean cleaner fuels and technologies sent to other regions.*

Thank You

smui@nrdc.org

415/875-6700

111 Sutter Street, San Francisco CA

For more information regarding NRDC

http://www.nrdc.org/